

REMARKS

In the last Office Action, the Examiner rejected claims 1, 4, 6, 10, 13, 15 and 19-20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,523,283 to Sueshige. Claims 2, 3, 5, 7-9, 11, 12, 14 and 16-18 were objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants and applicants' counsel note with appreciation the indication of allowable subject matter concerning claims 2, 3, 5, 7-9, 11, 12, 14 and 16-18. However, for the reasons noted below, applicants respectfully submit that independent claims 1 and 10, which have been amended to incorporate the subject matter of claims 6 and 15, respectively, also patentably distinguish from the prior art of record.

In accordance with the present response, independent claims 1 and 10 have been amended to incorporate the subject matter of claims 6 and 15, respectively, which have been canceled. As set forth in detail below, Sueshige does not disclose or describe the control unit and corresponding function recited in claims 1 and 10, or any structure corresponding to "a stopper member for temporarily stopping movement of the disk-shaped member to restore the detector to

the OFF state from the ON state", as recited in claims 6 and 15, now the subject matter of claims and 10, respectively.

Allowable claims 2, 5, 11 and 14 have been rewritten in independent form to incorporate the subject matter of base claims 1 and 10, respectively. Claims 7-9 and 16-18 have been amended to depend on claims 1 and 10, respectively, in light of the incorporation of claims 6 and 15 into claims 1 and 10. Claims 4, 6, 13, 15, 19 and 20 have been canceled without prejudice or admission.

Applicants most respectfully request entry of the foregoing amendments since they merely comprise amendment of independent claims 1 and 10 to incorporate the subject matter of dependent claims 6 and 15, respectively, the subject matter of which has already been considered by the Examiner.

Allowable claims 2, 5, 11 and 14 have been rewritten in independent form to incorporate the subject matter of base claims 1 and 10, respectively. Claims 7-9 and 16-18 have been amended to depend on base claims 1 and 10, respectively, in light of the incorporation of claims 6 and 15 into claims 1 and 10. In addition, the amendments substantially narrow any appealable issues because they cancel a significant number of other claims (4, 6, 13, 15, 19 and 20). Thus, entry of the foregoing amendments does not impose a burden on the Examiner and should not be denied.

Applicants request reconsideration of their application in light of the following discussion.

Brief Summary of the Invention

The present invention is directed to an overload prevention device for a snow removing vehicle.

Conventional snow removing machines are known which clear snow by transmitting power from an engine to a rotary auger. As described in the specification (pgs. 1-2), during a snow removing operation with the conventional snow removing machines, the auger oftentimes bites into a lump of ice or a stone causing the auger to stop rotating. This causes an excessive load to act on the power train from the engine to the auger.

Several types of the foregoing conventional snow removing machines incorporate a detector for detecting an excessive load acting on the power train from the engine to the auger. However, when an overload is detected, if the engine is stopped by instantaneous overloads occurring at times such as when the auger hits a curbstone or the like, or if the engine is stopped by noise from the detector, optimal overload detection and prevention cannot be achieved. Stated otherwise, the detectors of the conventional snow removing machines have not been able to effectively distinguish between

instantaneous overloading occurring when the auger hits a curbstone or the like and erroneous overloading caused by detector noise from continuous overloading caused by the auger biting into snow or debris.

The present invention overcomes the drawbacks of the conventional art. Figs. 1-22 show an embodiment of an overload prevention device 60 for a snow removing machine 10 according to the present invention embodied in the claims. The overload prevention device 60 forms part of an auger transmission 18 of the snow removing machine 10 and prevents an excessive load from acting on a power train of the auger transmission 18 which transmits power from the engine 15 to an auger 23 and an auger shaft 22 of the snow removing machine 10.

The overload prevention device 60 has a worm wheel 38 (e.g., first rotational member) meshing with a worm 37 formed on an input shaft 36 of the auger transmission 18. The worm wheel 38 has protrusions 83 formed at a side surface thereof. A cylindrical member 41 (e.g., second rotational member) is integrally connected to the auger shaft 22 and engages with the worm wheel 38 for rotation therewith over a predetermined torque range and for rotation relative thereto when a predetermined torque is exceeded. A generally disk-shaped member 45 (e.g., movable member) is disposed adjacent

to the worm wheel 38 for restricting a rotating angle of the cylindrical member 41. The disk-shaped member 45 has a plurality of generally disk-shaped protuberances 93 facing the protrusions 83 of the worm wheel 38. A detector 53 outputs a detection signal each time the detector detects movement of the disk-shaped member 45 away from the side surface of the worm wheel 38 when the protuberances 93 of the disk-shaped member 45 ride on the protrusions 83 of the worm wheel 38 responsive to rotation of the cylindrical member 41 and the worm wheel 38 relative to one another. The detector 53 has an ON state corresponding to a state during which the detector 53 outputs the detection signal and an OFF state corresponding to a state during which the detector 53 does not output the detection signal.

A control unit stops operation of the engine 15 when the detector 53 outputs the detection signal a preselected number of times within a preselected time period. A stopper member 59 temporarily stops movement of the disk-shaped 55 member to restore the detector 53 to the OFF state from the ON state.

Thus the overload protection device according to the present invention incorporates a control unit which stops the engine when the number of times the detector outputs the detection signal reaches a preselected number of times within

a preselected time period. By this structure and function, instantaneous overloads occurring when the auger hits a curbstone or the like can be accurately and efficiently distinguished from continuous overloading caused by the auger biting into snow or debris during a snow removing operation, thereby improving the operational efficiency of the snow removing machine.

Traversal of Prior Art Rejection

Claims 1, 6 (now the subject matter of claim 1), 10 and 15 (now the subject matter of claim 10) were rejected under 35 U.S.C. §102(e) as being anticipated by Sueshige. Applicants respectfully traverse this rejection and submit that amended independent claims 1 and 10 recite subject matter which is not identically disclosed or described in Sueshige.

Amended independent claim 1 is directed to an overload prevention device for an auger transmission of a snow removing machine and for preventing an excessive load from acting on a power train of the auger transmission from an engine to an auger and an auger shaft of the snow removing machine. Independent claim 1 has been amended to incorporate the subject matter of claim 6 and requires a worm wheel meshing with a worm formed on an input shaft of the auger transmission, the worm wheel having a plurality of wheel

protrusions formed at a side surface thereof, a cylindrical member integrally connected to the auger shaft and engaging with the worm wheel for rotation therewith over a predetermined torque range and for rotation relative thereto when a predetermined torque is exceeded, a generally disk-shaped member disposed adjacent to the worm wheel for restricting a rotating angle of the cylindrical member, the disk-shaped member having a plurality of generally disk-shaped protuberances facing the wheel protrusions of the worm wheel, and a detector for outputting a detection signal each time the detector detects movement of the disk-shaped member away from the side surface of the worm wheel when the protuberances of the disk-shaped member ride on the wheel protrusions of the worm wheel responsive to rotation of the cylindrical member and the worm wheel relative to one another, the detector having an ON state corresponding to a state during which the detector outputs the detection signal and an OFF state corresponding to a state during which the detector does not output the detection signal. Amended claim 1 further requires a control unit for stopping operation of the engine when the detector outputs the detection signal a preselected number of times within a preselected time period, and a stopper member for temporarily stopping movement of the disk-shaped member to restore the detector to the OFF state from the ON state. No

corresponding structural and functional combination is disclosed or described by Sueshige.

Sueshige discloses an overload protection mechanism 60 for a snow removing machine (Figs. 1-7). The overload protection mechanism 60 includes several components corresponding to those of the overload prevention device recited in claim 1, including a worm wheel 38, a cylindrical member 41, a disk-shaped member 45, and a detector 53.

However, Sueshige does not disclose or describe the control unit recited in independent claim 1. More specifically, Sueshige does not disclose or describe a control unit for stopping operation of the engine when the detector outputs the detection signal a preselected number of times within a preselected time period, as recited in independent claim 1. In Sueshige, the engine is stopped when the detector 53 (i.e., a washer detection switch) operates upon forced displacement of a movable element 76 thereof (col. 6, lines 1-8). Sueshige does not disclose any means for stopping operation of the engine when the detector outputs the detection signal a preselected number of times within a preselected time period, as recited in independent claim 1. Thus Sueshige suffers from the drawbacks of conventional overload protecting devices which are not capable of distinguishing instantaneous overloads occurring when the

auger hits a curbstone or the like from continuous overloading caused by the auger biting into snow or debris during a snow removing operation.

Moreover, in order to expedite prosecution, independent claim 1 has been amended to incorporate the subject matter of claim 6 which requires that the detector has an ON state corresponding to a state during which the detector outputs the detection signal and an OFF state corresponding to a state during which the detector does not output the detection signal, and that the overload prevention device further comprises a stopper member for temporarily stopping movement of the disk-shaped member to restore the detector to the OFF state from the ON state. No corresponding structural and functional combination is disclosed or described by Sueshige.

More specifically, while disclosing a disk-shaped member (slide washer 45), Sueshige does not disclose or describe any structure corresponding to "a stopper member for temporarily stopping movement of the disk-shaped member to restore the detector to the OFF state from the ON state", as recited in amended independent claim 1. In this regard, Sueshige discloses structure for "restricting" rotational movement of the disk-shaped member (col. 6, lines 14-18; col. 7, line 64 to col. 8, line 5), but not for "temporarily

stopping" movement of the disk-shaped member, as recited in amended independent claim 1.

Independent claim 10 has been amended to incorporate the subject matter of claim 15 which requires that the detector has an ON state corresponding to a state during which the detector outputs the detection signal and an OFF state corresponding to a state during which the detector does not output the detection signal, and that the overload prevention device further comprises a stopper member for temporarily stopping movement of the third rotational member to restore the detector to the OFF state from the ON state. No corresponding structural and functional combination is disclosed or described by Sueshige as set forth above for amended independent claim 1.

In the absence of the foregoing disclosure recited in amended independent claims 1 and 10, anticipation cannot be found. See, e.g., W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration"); Continental Can Co. USA v. Monsanto Co., 20 USPQ2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found");

Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added) ("Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim").

Stated otherwise, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. This standard is clearly not satisfied by Sueshige for the reasons stated above. Furthermore, Sueshige does not suggest the claimed subject matter and, therefore, would not have motivated one skilled in the art to modify Sueshige's overload protection mechanism to arrive at the claimed invention.

In view of the foregoing, applicants respectfully request the rejection of claims 1 and 10 under 35 U.S.C. §102(e) as being anticipated by Sueshige be withdrawn.

Applicants most respectfully request entry of the foregoing amendments since they merely comprise amendment of independent claims 1 and 10 to incorporate the subject matter of dependent claims 6 and 15, respectively, the subject matter of which has already been considered by the Examiner. Allowable claims 2, 5, 11 and 14 have been rewritten in independent form to incorporate the subject matter of base

claims 1 and 10, respectively. Claims 7-9 and 16-18 have been amended to depend on base claims 1 and 10, respectively, in light of the incorporation of claims 6 and 15 into claims 1 and 10. In addition, the amendments substantially narrow any appealable issues because they cancel a significant number of other claims (4, 6, 13, 15, 19 and 20). Thus, entry of the foregoing amendments does not impose a burden on the Examiner and should not be denied.

In view of the foregoing amendments and discussion,
the application is believed to be in allowable form.
Accordingly, entry of this amendment and favorable
reconsideration and allowance of the claims are most
respectfully requested.

Respectfully submitted,

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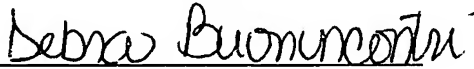
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